MODEL 7600A

HIGH SPEED STRAIN GAGE READOUT

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SECIFICATIONS

Accuracy:

- ±.01% of reading ±1 counts of A/D @ 25°C. Temperature coefficient 50ppm/degree Celsius.

Display:

- -32768 to +32767 with programmable decimal points.
- .56" Red LED

NMRR:

- 70db

A/D Converter:

- 16 bits, 65,536 counts (± 32,768) 1,000 reading per second maximum.

Input Analog Filter:

- 4 pole active anti-alias
- 500Hz cutoff on single channel unit, 250Hz cutoff on dual channel unit.

Rollover Error:

- ±50 NA maximum, ±100 pA/C° (per input channel)

Input Bias Current:

- ±50 NA maximum, ±1200pA/C° (per input channel)

Input Impedance:

- $10^{12}\Omega$ Input Impedance

Excitation:

- ±15VDC ±50mV, ±.5VDC ±25mV. Selectable by DIP switch on rear of unit. power up to four 350Ω bridges. When DC power option is selected the unit will only power one 350Ω bridge. Two sense leads for six wire hookup.

Range Selection:

- Selectable by DIP switch on rear of unit.

Calibration:

- Digital calibration via front panel switches
- No potentiometer adjustments
- Calibration switches can be disabled with access code to prevent unauthorized access to calibration parameters.

Front Panel Controls:

- Five push button switches for programming digital filter, offset, span, limits and recall of peak reading or run out from storage.

Channels:

- One channel standard with second channel optional.

Reading Rate:

- Limited to 1000 per second divided by number of channels.

Digital Filter:

- Programmable cutoff frequency 1Hz to 500Hz.
- Display updates 3 time per second.

Peak Detector:

- Update at rate selected by digital filter. Peak is normally stored in memory and recalled via front panel switch, over the serial interface or by selecting peak detect display mode on rear connector. If peak display mode is selected an internal timer can be programmed to give limit #1 output up to 100 seconds after a programmed limit is reached. This output can be used to reset the peak reading by tying limit #1 output to remote input.

Run Out Mode:

- Updated at rate selected by digital filter. Runout is normally stored in memory and recalled via front panel switch, over the serial interface, or by selecting runout display mode on rear connector. If runout display mode is selected an internal timer can be programmed to give Limit #1 output up to 100 seconds after a programmed limit is reached. This output can be used to reset the runout reading by tying Limit #1 output to remote input.

Analog Output:

- 0 - 10VDC, 0 - 5VDC, 4 – 20mA, tracks display reading.
- Voltage outputs will sink or source 1mA.
- 300V isolation between analog outputs and instrument ground
- 12 bit D/A converter updated at selected digital filter rate.

Convert/Hold Input:

- Normally high, if pulled low will hold display.
- Requires 1 millisecond positive pulse for single conversion.

Limit Outputs:

- Four isolated open collector transistor outputs rated 30VDC maximum.
- Will sink up to 100mA.
- 300V isolation between limit outputs and system ground.
- Limit #1 can be programmed to be delayed from 1 to 100 second in one second increments. Optional: Two form "A" relay contacts, rated 2.5 A @ 115VAC. Isolated transistor outputs not available when relays are installed. Limit 1 and Limit 2 activated the relay contacts.

I/O Method:

- Quick disconnect screw terminal block, RJ11 Jack for serial interface.

Power:

- 115/230VAC Selectable by switch on rear of unit.
- 8 watts maximum
- Optional 10-30VDC @ 600mA

Remote Inputs:

- Active low TTL compatible, 50 millisecond negative pulse required.
- Tare
- Display peak reading
- Display run out.
- Reset peak reading or run out reading.

Operation Temperature Range:

- -20°C to +60°C

Serial Interface:

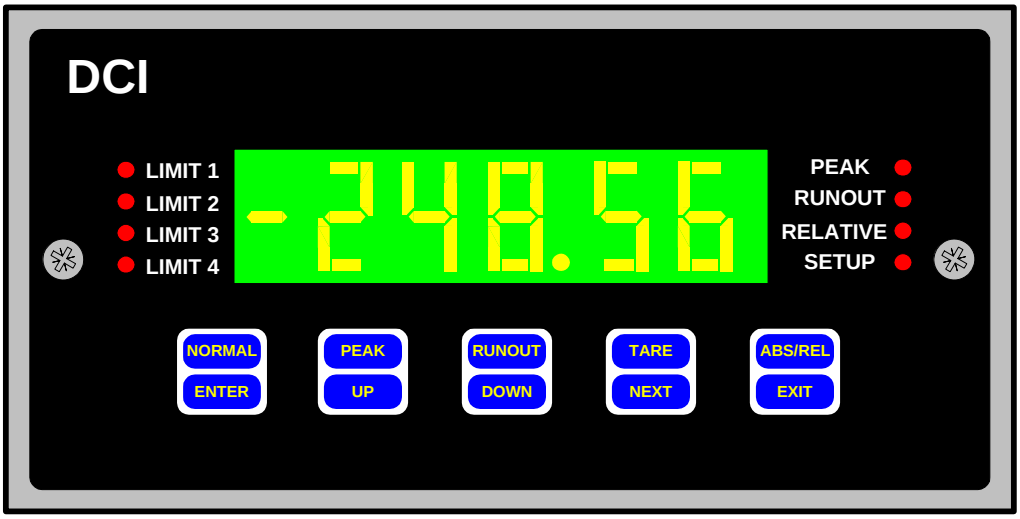
- ASCII RS232 or RS485 compatible (optional).
- 300V isolation to system ground.

Options:

- 01 ASCII RS232 serial interface
- 02 ASCII RS485 serial interface
- 04 Second input channel
- 09 Analog output 0 – 5VDC
- 10 Two relay outputs rated at 2.5A @ 115VAC, These relay outputs take the place of the open collector outputs.
- 12 9-18VDC @ 600mA
- 24 18-36VDC @ 500mA

Case Size:

- 2.70”H X 5.18”W X 6.00.”D (Panel Cut Out 2.45”H X 5.06”W)

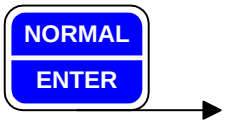


DESCRIPTION:

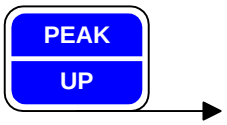
The Model 7600A is a high speed, high resolution, strain gauge readout. The unit performs 1000 conversions per second with 15 bits (plus sign) resolution. Limit checking and Peak/Runout tracking are all done at a user selectable rate (from 1 - 500Hz); meanwhile, the display provides a stable 1Hz filtered data reading. Peak and runout data can also be displayed using front panel switches. A tare reading of up to 50% of span can be entered with a single front panel switch press. The tare feature can be enabled or disabled at any time, without losing the tare value itself, using the unit's absolute and relative reading modes. Limit status and display mode settings are always clearly indicated with front panel LED's. Programming of the unit is easily performed using all five of the front panel switches, and calibration requires a security code which prevents unwanted corruption of calibration data. Remote interfacing is available via RS232/RS485 (optional), or active low logic inputs located on the rear of the unit.

SWITCH FUNCTIONS:

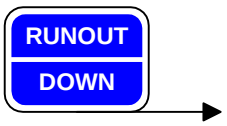
There are five switches located behind the front lens of the model 7600A. The front panel switches appear as shown below. The text located at the top half of each switch (i.e., NORMAL, PEAK, RUNOUT, TARE, ABS/REL) indicates that particular switch's function when the unit is in data acquisition and display mode. The text located in the lower half (i.e., ENTER, UP, DOWN, NEXT, EXIT) indicates the switch's function during setup and calibration. A complete description of each switch is as follows:



Data Acquisition & Display
: Press to set the display mode for actual reading.
Setup & Calibration Modes
: Press to record a complete setting and advance to the next setup.

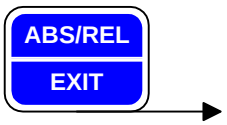


Data Acquisition & Display
: Press to set the display mode for peak.
Setup & Calibration Modes
: Press to increment the digit/parameter being set.



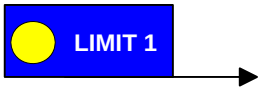
Data Acquisition & Display
: Press to set the display mode for runout.
Setup & Calibration Modes
: Press to decrement the digit/parameter being set.

Data Acquisition & Display
: Press to record the current reading as the tare value.
Setup & Calibration Modes
: Press to advance to the next digit to be set.

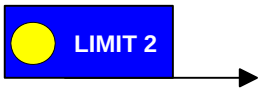


Data Acquisition & Display
: Press to toggle between absolute and relative reading mode.
Setup & Calibration Modes
: Press to exit the setup or calibration mode at any time (all prior changes are saved).

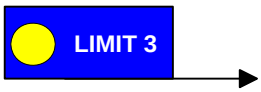
LED INDICATORS:



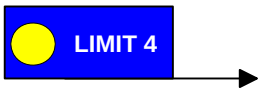
Limit 1 Illuminates when the display reading exceeds the set limit, and in the setup mode when establishing the limit.



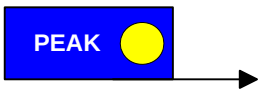
Limit 2 Illuminates when the display reading exceeds the set limit, and in the setup mode when establishing the limit.



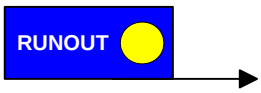
Limit 3 Illuminates when the display reading exceeds the set limit, and in the setup mode when establishing the limit.



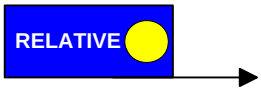
Limit 4 Illuminates when the display reading exceeds the set limit, and in the setup mode when establishing the limit.



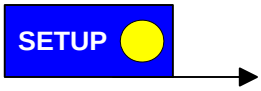
Peak Illuminates when the display is set in the peak mode.



Runout Illuminates when the display is set in the runout mode.



Relative Illuminates when the display is set in the relative mode.



Setup Illuminates when the display is in the setup mode.

SETUP:

Meter setup is accomplished by using all five of the front panel switches. The setup mode is entered by pressing the Normal [Enter] and Peak [Up] switches simultaneously.

Set Up:

will flash on the display for a second and the setup LED indicator will illuminate. While in the setup mode, programming of the meter functions is accomplished by setting individual digits of the various parameters (with the exception of baud rate and decimal point programming). A flashing digit indicates that it is the active digit being set. The flashing digit can be incremented by pressing the UP switch; conversely, it can be decremented by pressing the DOWN switch. Once a particular digit has been set to the desired value the NEXT switch can be pressed to advance to the next digit. Once all the digits have been set to the proper value the ENTER switch can be pressed to advance to the next parameter. At any time during the setup sequence the EXIT switch can be pressed to leave the setup mode and save the current settings. If the setup sequence is completed the unit will save all settings and automatically return to data acquisition and display mode. If a meter setup is started, and a long period (approximately 100 seconds) of inactivity is detected by the meter, the meter will return to data acquisition and display mode without saving any new settings.

Limit Programming:

All four limits are programmed in succession (1 through 4) immediately after entering the setup mode. The corresponding LED illuminates to indicate which limit is being programmed.
The limit number for each limit is programmed first. It can be set for any number within the display span (as determined by the meter calibration). How the unit will use that number for limit detection and activation is determined by the limit mode, which is programmed following the limit number.

Limit Mode:

Will indicate that you are now programming the limit-operating mode. A definition of how the digits of the mode number affect operation of a limit as follows:

1XX – Channel # 1
2XX – Channel # 2
X0X – High Limit
X1X – Low Limit
XX0 – Reading
XX1 – Peak
XX2 - Runout

Note: Each limit (1 through 4) has it's own limit number and limit mode to be entered.

Limit One Delay:

The limit one delay is a programmable delay, from 0 - 100 seconds, between the time a reading exceeding the limit one number is detected and when the limit one output will be activated. Using the delay feature, the limit one output can be tied to the REMOTE RESET input on the rear of the unit to reset the peak reading so that the next peak can be properly detected in a process sequence.

Decimal Point Position:

The calibration span number is displayed with the decimal point shown in its selected position. The decimal point can be moved across the display to the desired position using the UP and DOWN switches.

Filter Setup:

The digital filter determines the rate at which the limits are checked for output activation, peak/runout tracking, and analog output updates. The digital filter is programmable from 1 to 500Hz. When stability is more an issue than speed the filter should be set closer to 1Hz; conversely, when quick detection and activation is more important the filter should be set closer to 500Hz. **Note: Unless the serial option is installed, the setup sequence is now finished and the unit will return to acquisition and display mode.**

Baud Rate Selection:

Program the desired baud rate using the UP or DOWN switches to toggle through the available settings (300, 600, 1200, 2400, 4800, 9600, 19200, and 38400). Once the proper baud rate is selected press the ENTER switch to advance to the next setup.

Echo Setup:

The model 7600A can be programmed to automatically re-transmit (echo) characters received on its serial communications input. A value of one enables the echo feature; conversely, programming a zero will disable it.

Linefeed Setup:

The unit can be programmed to transmit linefeed characters in addition to the carriage return that is transmitted at the end of data strings. Programming a one will enable transmission of linefeed characters, while programming a zero will prevent their transmission.

Unit Address Setup:

Multiple 7600A units can be networked together on a serial bus using the addressing capability of the unit. Each unit can have a unique address from 0 to 250 (Note: 0 disables the address feature since the unit will respond to all incoming commands/queries).

Legend Setup:

The 7600A can append a user selectable engineering units string to readings transmitted from the unit. This feature allows direct terminal readout in engineering units, or easier unit identification in multi-unit applications. Program the legend number to the number corresponding with desired units as shown in the table below.

Legend Table

0 - No Legend	4 - kpa.
1 - lbs.	5 - mV.
2 - kegs.	6 - mA.
3 - psi.	7 - V.

Continuous Update:

The model 7600A can be programmed to automatically transmit the display reading at selectable time intervals. The update interval can be programmed from 20 times per second (-1) up to a maximum of 3600 seconds (3600). A value of zero disables the automatic update function.

Device Code:

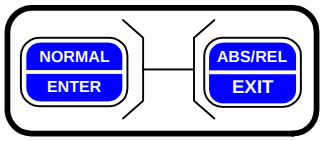
A non-printable device code allows units to take turns on a serial bus when daisy chained to a printer or some other data-recording device. A value of one enables transmission of the device code following the reading string; conversely, a value of zero disables transmission of the device code.

Serial Command:

A serial command can automatically be executed upon receipt of a non-printable code (see device code above). A table of numbers associated with each serial command can be found in the serial communications section of the manual (on page 8). Program to the number associated with the command to be executed when the unit receives a device code character on its serial communications input.

CALIBRATION:

The calibration mode is entered by pressing the Normal [Enter] and ABS/REL [Exit] switches simultaneously. **Note: This is the only method to check or change the calibration of this unit externally.**



Protection Code:

Before any calibration can be performed on the unit a unique security code must be entered. If the code is not entered correctly the unit will automatically revert to display and acquisition mode; otherwise, the user is allowed to proceed with the calibration sequence. To enter the code use the Peak[Up] or the Runout[Down] switches to enter the code any were from 0 - 255. The unit is shipped from the factory with a programmed code of 10.

Protection Code Programming:

A different protection code can be programmed at this time. The code can be anywhere in the range 0 - 255. If a new code is not required simply press ENTER to continue with the calibration sequence.

Channel Selection Programming:

The display will now show one (1) to indicate that the calibration is to be performed on channel #1 as the default. If channel number two calibration is required, select number two (2). To select the channel number use the Peak[Up] or Runout[down] switch to toggle the number. Press enter to continue with calibration.

Span Number Programming:

The span number is the display reading that is associated with the input obtained during the DEAD WEIGHT STAY portion of the calibration sequence (a display reading of zero is automatically associated with the DEAD WEIGHT ZERO calibration step). The span number can be programmed to a maximum of 32,767 display counts. (Note: If your deadweight stay calibration will be performed using something less than the actual expected full-scale input, the desired reading for the dead weight stay calibration input should still be used as the span number. Example: There's a dead weight stay load cell of 10,000 lbs., but a shunt cal resistor is only available for 8,000 lbs., so calibrate as shown on page 8. The unit will respond to the full scale of 10,000 lbs. even though the unit is calibrated at 8,000 lbs.)

***Dead Weight Zero*:**

This is the zero (null) point calibration step. Set the transducer or calibrator for zero output, allow sufficient time for the reading to stabilize, then press the ENTER switch to store the new zero calibration data.

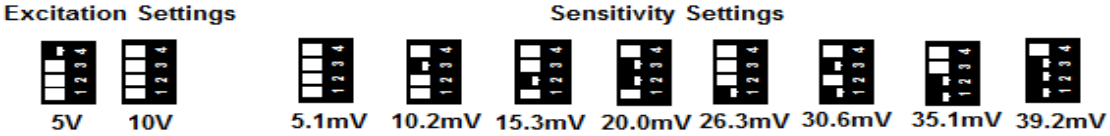
Dead Weight Stay:

This is the span point calibration step. Check to make sure that the span setting is selected to match the desired input range. Set the transducer or calibrator for full-scale output, allow sufficient time for the reading to stabilize, then press the ENTER switch to store the new span calibration data.

SENSITIVITY PROGRAMMING:

Pick a sensitivity setting that is as close as possible, without going under, the expected full-scale output from the transducer being used.

Example: Assume that a 10,000 pound capacity load cell with an output of .5mV/V full-scale is going to be used with the 7600A. Also assume that the excitation required 10V; therefore, the full-scale input to the unit will be 5mV at 10,000 pound, and the sensitivity switches located on the rear of the 7600A should be set for 5.1mV full-scale (S1 - S3 open).



SERIAL COMMUNICATIONS:

With the serial communications option installed, the model 7600A can easily be interfaced to a computer, terminal, or printer. The unit can operate in stand-alone mode or in networked applications. Both RS232 and RS485 serial communication options are available, for the 7600A. The baud rate is user selectable, and can range from 300 to 38.4K baud. The unit uses a N,8,1 character data format (no parity, 8 data bits, 1 stop bit). All data is transmitted/received as ASCII characters. Characters strings are transmitted/received with the leftmost character first and are terminated with a carriage return [CR]. Incoming linefeeds are ignored by the unit, and it is optional to have the unit transmit them. Leading zeros are acceptable for numeric data transmitted to the unit. Decimal points are ignored by the unit, and are transmitted, when required, to conform with the selected display format.
Listed below are the available commands for the model 7600A (with the associated command numbers). Following this is a discussion of how commands are interpreted by the unit along with a brief description for each command.

EH	Set Echo Mode	TM	Test Message
LF	Set Line Feed Mode	CR	Set Continuous Reading Mode
AE	Address Enable	LR	Set Legend
AD	Address Disable	DP	Set Decimal Point Position
RD	Read Display	SC	Remote Serial Command
S1	Set Limit One	PV	Set Display Mode
S2	Set Limit Two	AR	Absolute or Relative
S3	Set Limit Three	SF	Program Filter
S4	Set Limit Four	SN	Calibration Span Number
SP	Peak and Runout	SM	Serial Read Modes
SZ	Remote Tare	LM	Limit Mode

Each 7600A command consists of two upper-case alpha ASCII characters. In most instances, commands can be sent to the unit with a numeric value (ASCII format) attached for parameter setting. When the unit receives and executes a valid command it responds by transmitting "ok[CR]". Commands can also be sent to the unit without a parameter attached to interrogate the current setting for the parameter associated with that command. In this instance, the unit responds with the equivalent lower-case characters for that particular command along with an ASCII representation for the numeric value of the parameter in question. The following is an example of a possible exchange sequence between a model 7600A and a host computer:

Exchange 1:	HOST SENDS	: "AE0[CR]"
	7600A RESPONDS WITH	: "HELLO ae 0[CR]"
	(Note: The unit address is assumed to be set at zero.)	
Exchange 2:	HOST SENDS	: "RD[CR]"
	7600A RESPONDS WITH	: "99.99lbs[CR]"

(Note: It is assumed the display reading is 99.99 and that the legend is set for lbs.)

Exchange 3	HOST SENDS	: "S1 1000[CR]"
	7600A RESPONDS WITH	: "ok[CR]"
Exchange 4	HOST SENDS	: "S1[CR]"
	7600A RESPONDS WITH`	: "11 1000[CR]"
Exchange 5	HOST SENDS	: "AD0[CR]"
	7600A RESPONDS WITH	: "BYE ad 0[CR]"

Note: Remember [CR] represents a carriage return character.

The following is a list of the serial commands available on the 7600A. Each command string is shown in quotes, a parameter/number field is represented by X (first) or Y (second), the sign, where needed, is shown as a lower case s(s). A brief description is given for each command along with any particular programming instructions.

ECHO: "EH X[CR]"

The echo command allows enabling or disabling of the unit's echo feature. When the echo feature is turned on the unit automatically echo's all received characters.

X = 1 echo ON
X = 0 echo OFF

LINE FEED: "LF X[CR]"

The unit can be set to send a line feed character following each transmitted string.

X = 1 line feeds are transmitted.
X = 0 line feeds are not transmitted

ADDRESS ENABLE: "AE XXX[CR]"

The address enable command, in conjunction with the address disable command, can be used to network multiple 7600A units. Once a unit's address has been enabled it will respond to all incoming commands until the unit's address is disabled. When the address enabled command is executed by a 7600A it responds with "HELLO an XXX[CR]." **Note: a unit address of zero (0) disables the addressing feature and the address enable command is not required.**

ADDRESS DISABLE: "AD XXX[CR]", or "AD[CR]"

This command disables the unit at the specified address, or when an address in not attached, all units on the network. When the command is successfully executed, the unit will respond with "BYE ad XXX[CR]".

READ DISPLAY: "RD[C.R.]"

Requests transmission of the current 7600A display reading. The type of reading returned (i.e. peak, runout, or current input) will depend upon the display reading mode selected. The unit will format the reading with sign and decimal point as needed.

SET LIMIT: "S# XXXXX[CR]"

Allows remote setting of the 7600A limit numbers. The # should be replaced in the string with the number of the limit to be set (1 through 4).

PEAK AND RUNOUT: "SP[CR]"

When this command is received the peak and runout reading are then reset.

REMOTE TARE: "SZ X[CR]"

The remote tare command allows tare "capture" similar to that performed by the front panel TARE switch. When a number is attached to the command a new tare value is captured.

TEST MESSAGE: "TM[CR]"

The test message is primarily a diagnostic aid. When the test message command is received the unit will respond by outputting information particular to the model number and software version/revision.

CONTINUOUS READING: "CR XXXX[CR]"

The continuous reading command allows setting of the automatic update feature of the 7600A.

X = -2 - readings are transmitted 40 times per second
X = -1 - readings are transmitted 20 times per second
X = 0 - automatic updates disabled
XXXX = 1 - 3600 -number of seconds between updates

SET LEGEND: "LR X[CR]"

The set legend command allows a unit indicator to be attached to readings transmitted by the unit.

X = ? legend number (from the table on page 9) for reading units.

REMOTE SERIAL COMMAND: "SC X YY[CR]"

In data logging applications, involving several units daisy-chained together, a problem arises when it is desired to have several units automatically transmit readings at the same time interval (since contention could result in scrambled data at the printer). To compensate for this, the model 7600A allows unit to "take turns" on the same serial bus. This is done by enabling transmission of a special non-printable character at the end of a reading string; which, when received by the following unit will cause it to execute a serial command (RD would be most common). The second unit can have the device code enabled and so on. **Note: all units should have the echo function enable so that messages will pass along to the following units in the chain.**

DECIMAL POSITION: "DP X[CR]"

The display decimal point can be positioned using this command.
X = 0 88888 (no decimal point)
X = 1 88888.
X = 2 8888.8
X = 3 888.88
X = 4 88.888
X = 5 8.8888
X = 6 .88888

READING MODE: "PV X[CR]"

The display reading mode can be set using this command.

X = 0: Display is set for reading only
X = 1: Display is set for peak
X = 2: Display is set for runout

ABSOLUTE OR RELATIVE "AR X[CR]"

Allows changing of the display mode between absolute and relative.

X = 0 Absolute measurement only (tare is disabled)
X = 1 Relative measurement (tare enabled)

SET FILTER "SF XXX[CR]"

The set filter command can be used to remotely set the rate at which limit detection, peak/runout tracking, and analog output updates are performed.
XXX = 1 - 500 (Hz)

CALIBRATION SPAN NUMBER "SN X YYYY[CR]"

X = Channel number (1 or 2)
YYYY = Calibration span number

SERIAL READING MODE "SM X[CR]"

X = 0 : Serial read outputs channel #1 (display reading)
X = 1 : Serial read outputs channel #2 reading
X = 2 : Serial read outputs channel #2 peak
X = 3 : Serial read outputs channel #2 runout

LIMIT MODE "LM X N[CR]"

X = Limit number
N = Limit mode, bit defined as follows:

Normal	- 01	HEX
Peak	- 02	HEX
Runout	- 03	HEX
Channel #2	- 04	HEX
High limit	- 08	HEX

Example: Assume we want a high limit, normal (reading), active on channel one; then, YY = 01 OR'ed 08 = 09 HEX (NOTE: unlike most serial command parameters, this is not ASCII).

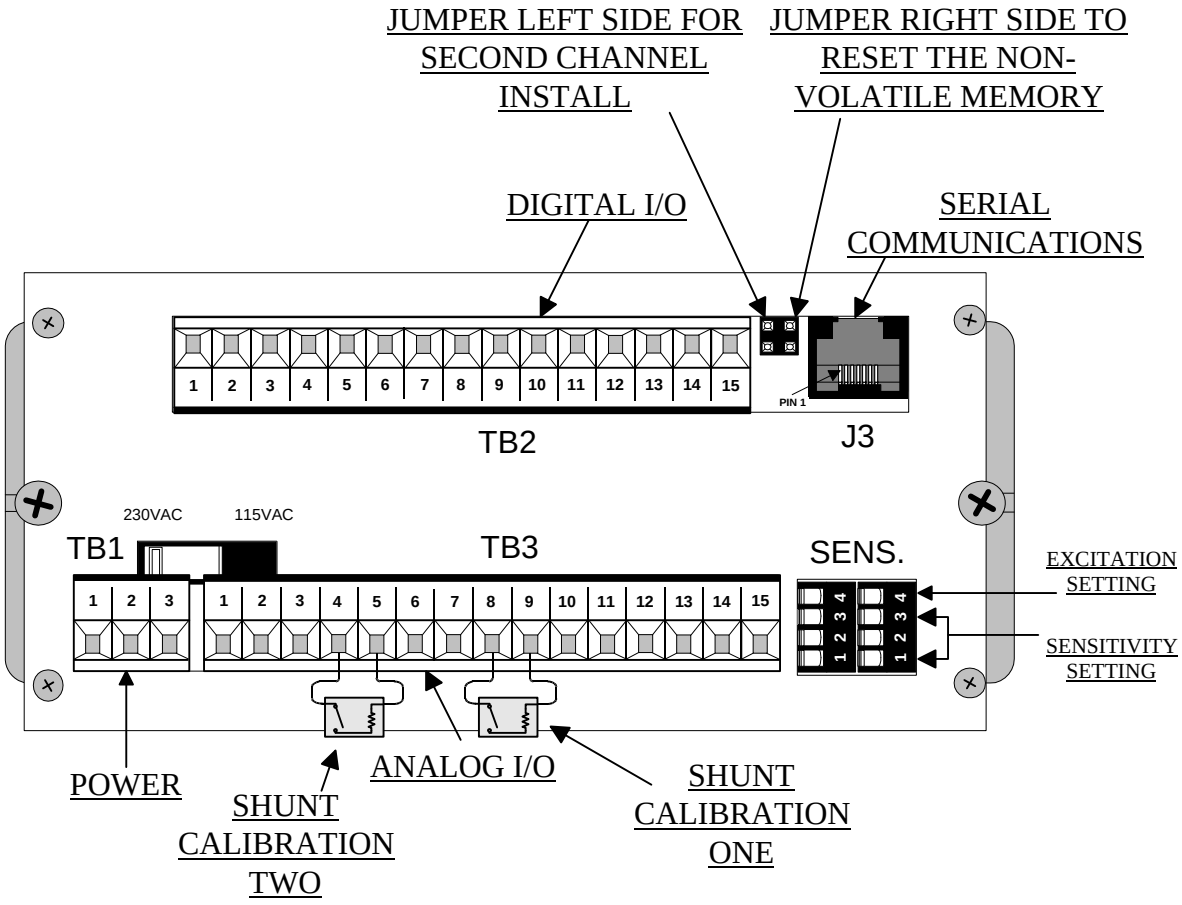
REMOTE INPUTS:

Seven logic level, active-low, remote inputs are located on the rear of the unit for interfacing to programmable logic controllers etc.. The remote inputs can be used to duplicate many of the front panel switch functions of the unit. A brief description of each input follows below:

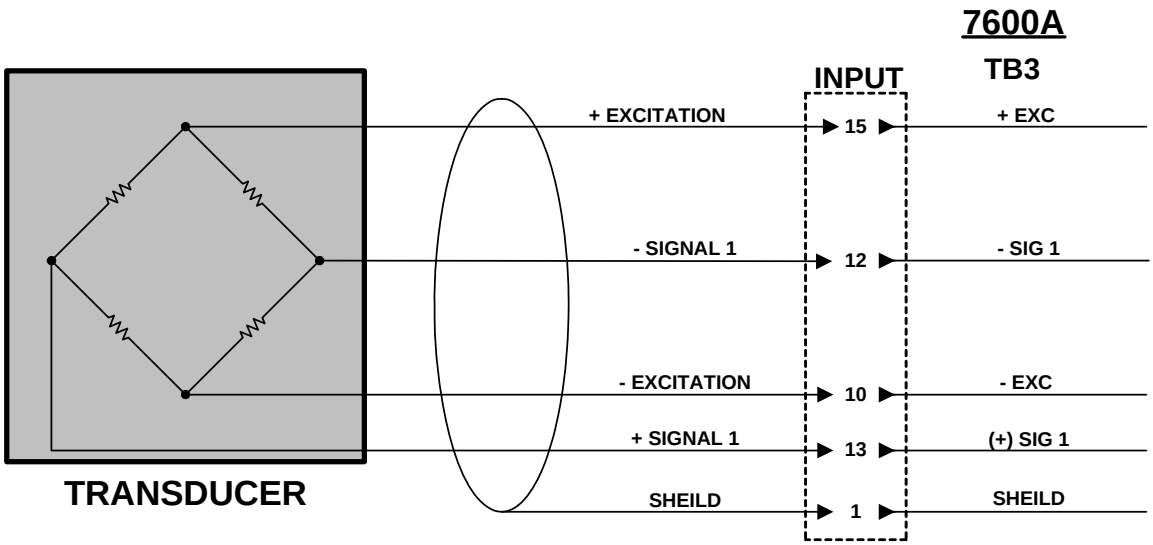
NORMAL MODE	(remote input #1)	- sets the display mode to reading only.
DATA REQUEST	(remote input #2)	- requests a serial transmission of the display reading
RESET P/R	(remote input #3)	- resets the peak and runout readings
DATA HOLD	(remote input #4)	- A/D samples are ignored while this input is active
RUNOUT MODE	(remote input #5)	- sets the display mode to runout
PEAK MODE	(remote input #6)	- sets the display mode to peak
CAPTURE TARE	(remote input #7)	- sets the tare value to the current display reading

All remote inputs must be active for a minimum of 50mS (with the exception of DATA HOLD which only needs to be held active a minimum of 1mS for detection).

7600A BACK VIEW



INPUT CONNECTIONS – TRANSDUCER TO TB3



7600A REAR TERMINATIONS

TB1 (POWER INPUT - BOTTOM BOARD)

(1) AC LINE
(2) AC NEUTRAL
(3) EARTH GROUND

TB2 (TOP BOARD)

(1) LIMIT 1
(2) LIMIT 2
(3) LIMIT 3
(4) LIMIT 4
(5) NORMAL MODE
(6) DATA REQUEST
(7) RESET P/R
(8) DATA HOLD
(9) RUNOUT MODE
(10) PEAK MODE
(11) CAPTURE TARE
(12) +5V
(13) ISOLATED POWER
(14) ISOLATED GROUND
(15) INSTRUMENT GROUND

TB3 (BOTTOM BOARD)

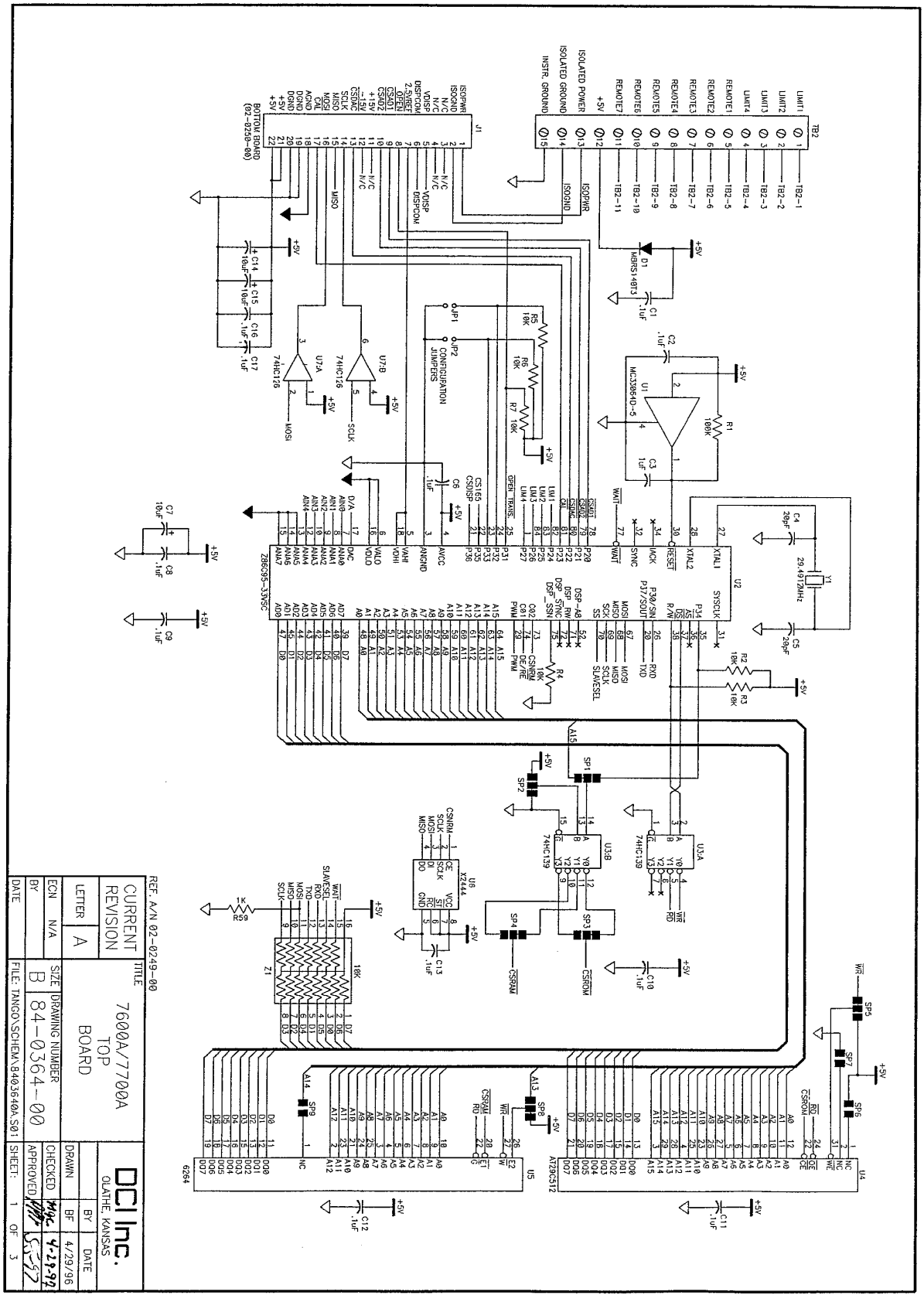
(1) SHIELD
(2) -15V
(3) ANALOG OUTPUT
(4) N/C
(5) N/C
(6) -SIGNAL2
(7) +SIGNAL2
(8) N/C
(9) N/C
(10) -EXCITATION
(11) N/C
(12) -SIGNAL1
(13) +SIGNAL1
(14) N/C
(15) +15VDC

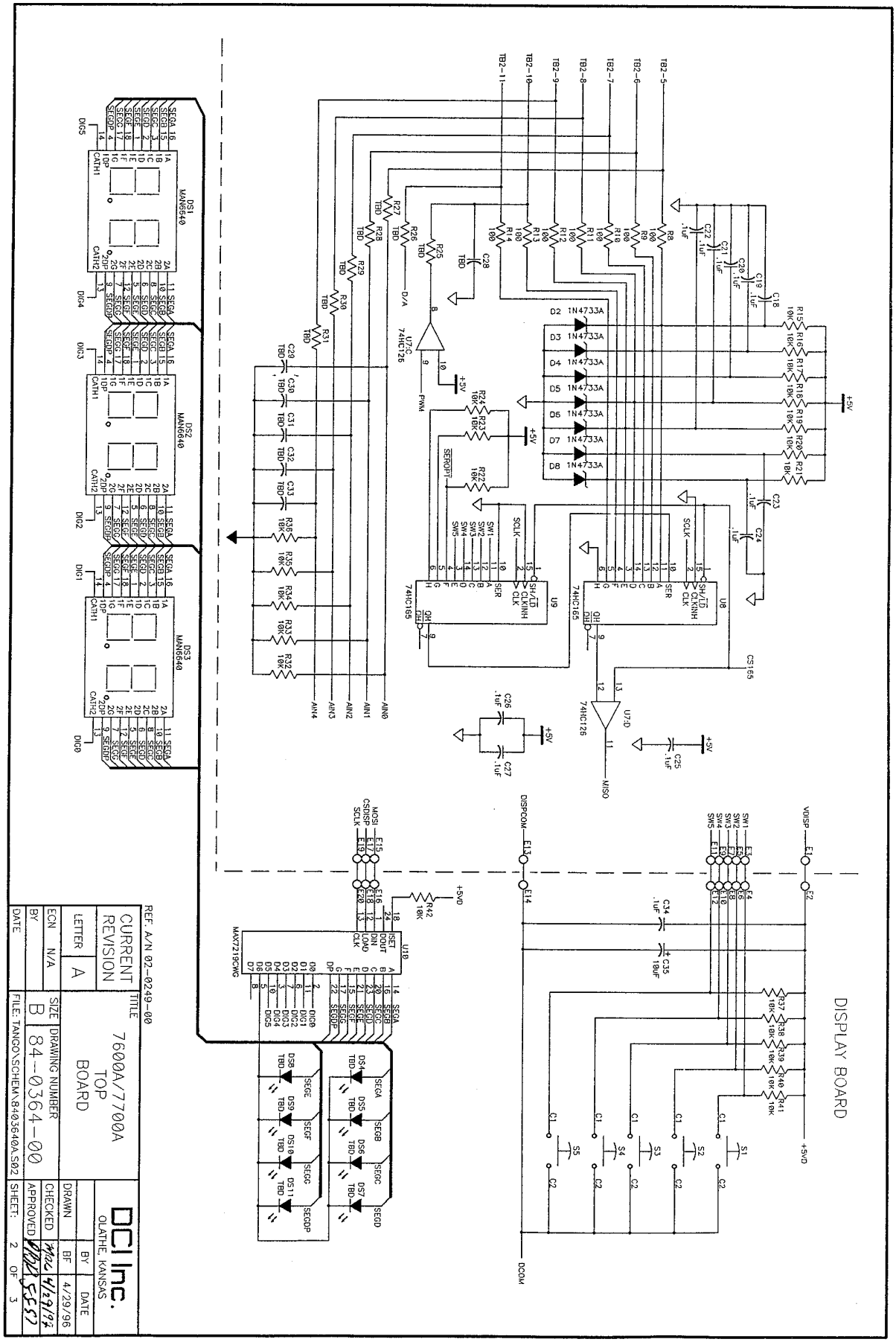
Note: TB2 pins 1-4 by default operate as open collector outputs. With optional relays pins 2 & 4 operate as switched relay outputs.

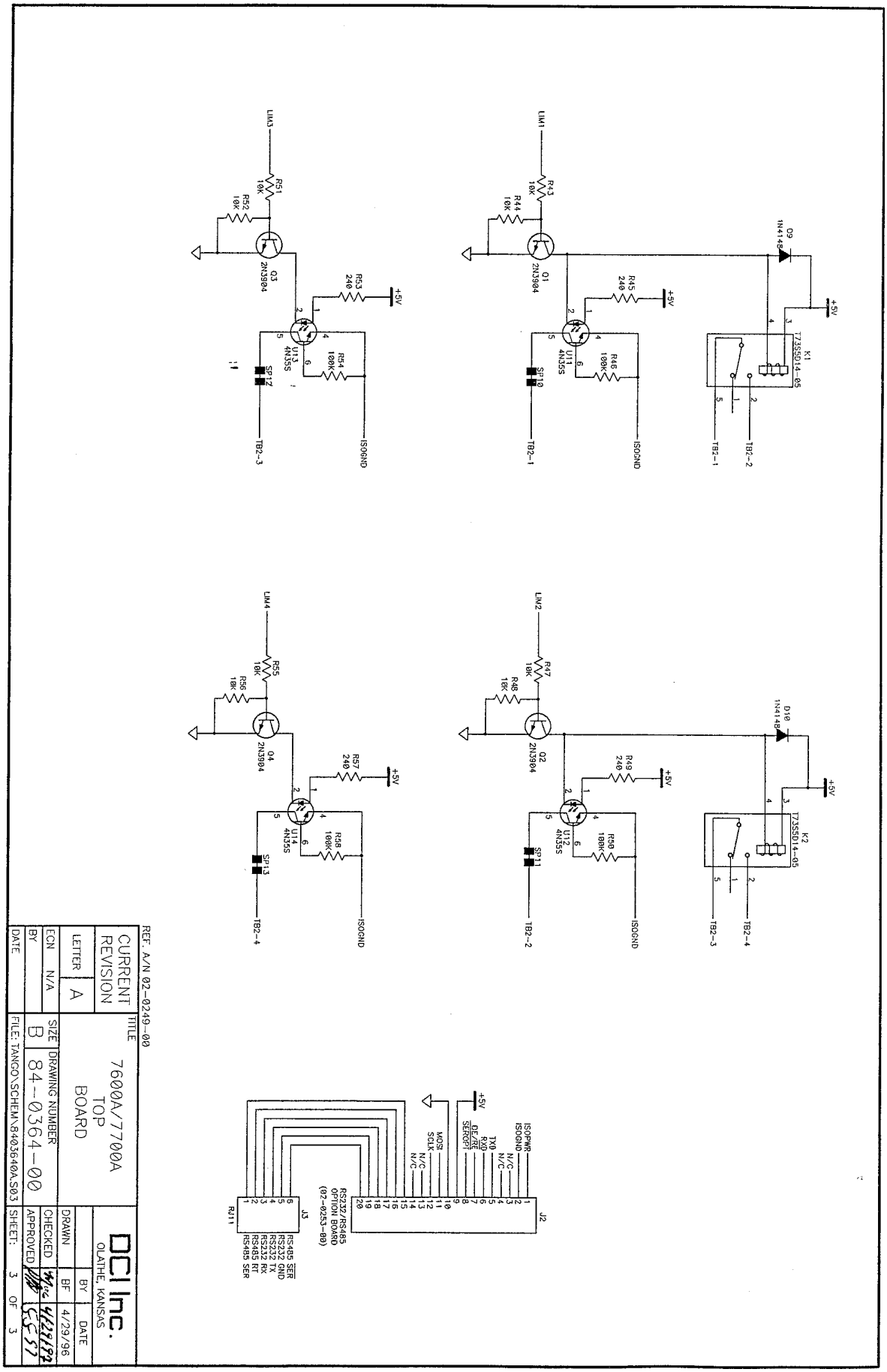
J3 (RJ11 - TOP BOARD)

(1) RS485 SERIAL
(2) RS485 TERMINATION RESISTOR
(3) RS232 RX
(4) RS232 TX
(5) RS232 - GROUND
(6) RS485 ~SERIAL

Note: Options will not operate without external input power. (TB2 Pin 13 and Pin 14)

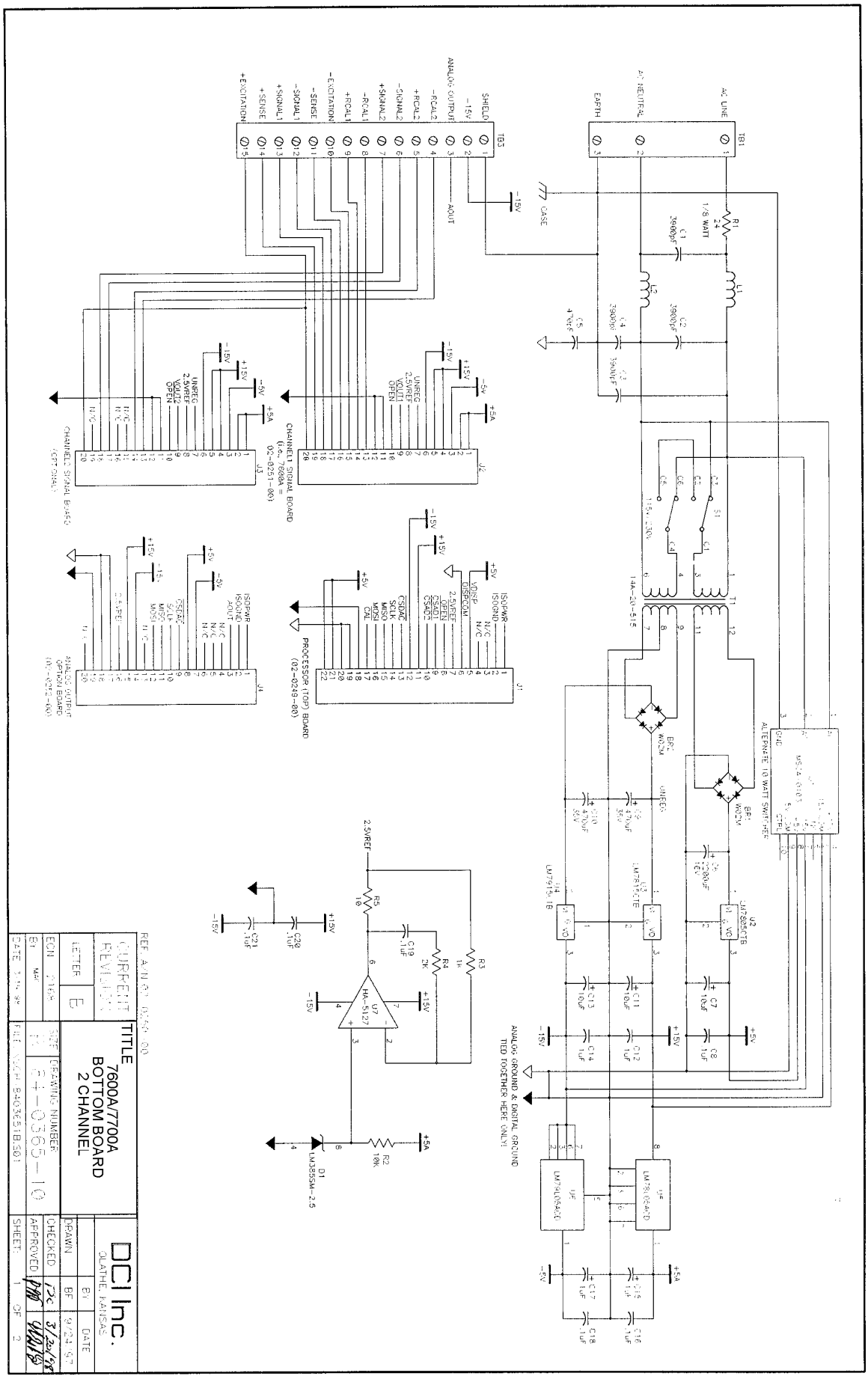

TB2
LIMIT1
LIMIT2
LIMIT3
LIMIT4
REMOTE1
REMOTE2
REMOTE3
REMOTE4
REMOTE5
REMOTE6
REMOTE7
+5V
ISOLATED POWER
ISOLATED GROUND
INSTR. GROUND
TB2-1
TB2-2
TB2-3
TB2-4
TB2-5
TB2-6
TB2-7
TB2-8
TB2-9
TB2-10
TB2-11
ISOPWR
ISOGND
J1
BOTTOM BOARD
(02-0259-00)
ISOPWR
ISOGND
N/C
+5VDC
VDISP
DISPCOM
2.5VREF
OPEN
CSAD1
CSAD2
-15V
CSDAC
SCLK
MISO
MOSI
AGND
DGND
DGND
+5V
+5V
MISO
N/C
N/C
VDISP
DISPCOM
MOSI
SCLK
SCLK
MOSI
U7A
U7B
74HC126
JP1
JP2
CONFIGURATION
JUMPERS
R5
10K
R6
10K
R7
10K
D1
MBRS140T3
C1
.1uF
C2
.1uF
C3
1uF
C4
20pF
C5
20pF
Y1
29.49152MHz
U1
MC33064D-5
R1
10K
R2
10K
R3
10K
R4
10K
U2
Z86C95-33VSC
XTAL1
XTAL2
SYSCLK
RESET
MCK
SYNC
WAIT
R/W
AS
DS
P34
P37/SDOUT
MOSI
MISO
SCK
SS
SLAVESEL
RXD
TXD
CSNRM
PWM
OPEN TRANS.
CS1/ES
CSDSP
VAHI
VALO
VDLO
AVCC
ANGND
D/A
ANA0
ANA1
ANA2
ANA3
ANA4
ANA5
ANA6
ANA7
C6
.1uF
C7
10uF
C8
.1uF
C9
.1uF
C14
10uF
C15
10uF
C16
.1uF
C17
.1uF
SP1
SP2
SP3
SP4
SP5
SP6
SP7
SP8
SP9
U3A
U3B
74HC139
U4
AT29C512
U5
6264
U6
X2444
CSROM
CSRAM
RD
WR
C10
.1uF
C11
.1uF
C12
.1uF
C13
.1uF
Z1
1K
R59
18K
REF. A/N 02-0249-00
CURRENT REVISION
LETTER
A
ECN N/A
BY
DATE
TITLE
7600A/7700A
TOP
BOARD
SIZE
B
DRAWING NUMBER
84-0364-00
FILE: TANGO\SCHEM\8403640A.S01
SHEET: 1 OF 3
DCI Inc.
OLATHE, KANSAS
DRAWN BY BF DATE 4/29/96
CHECKED
APPROVED
4-29-96

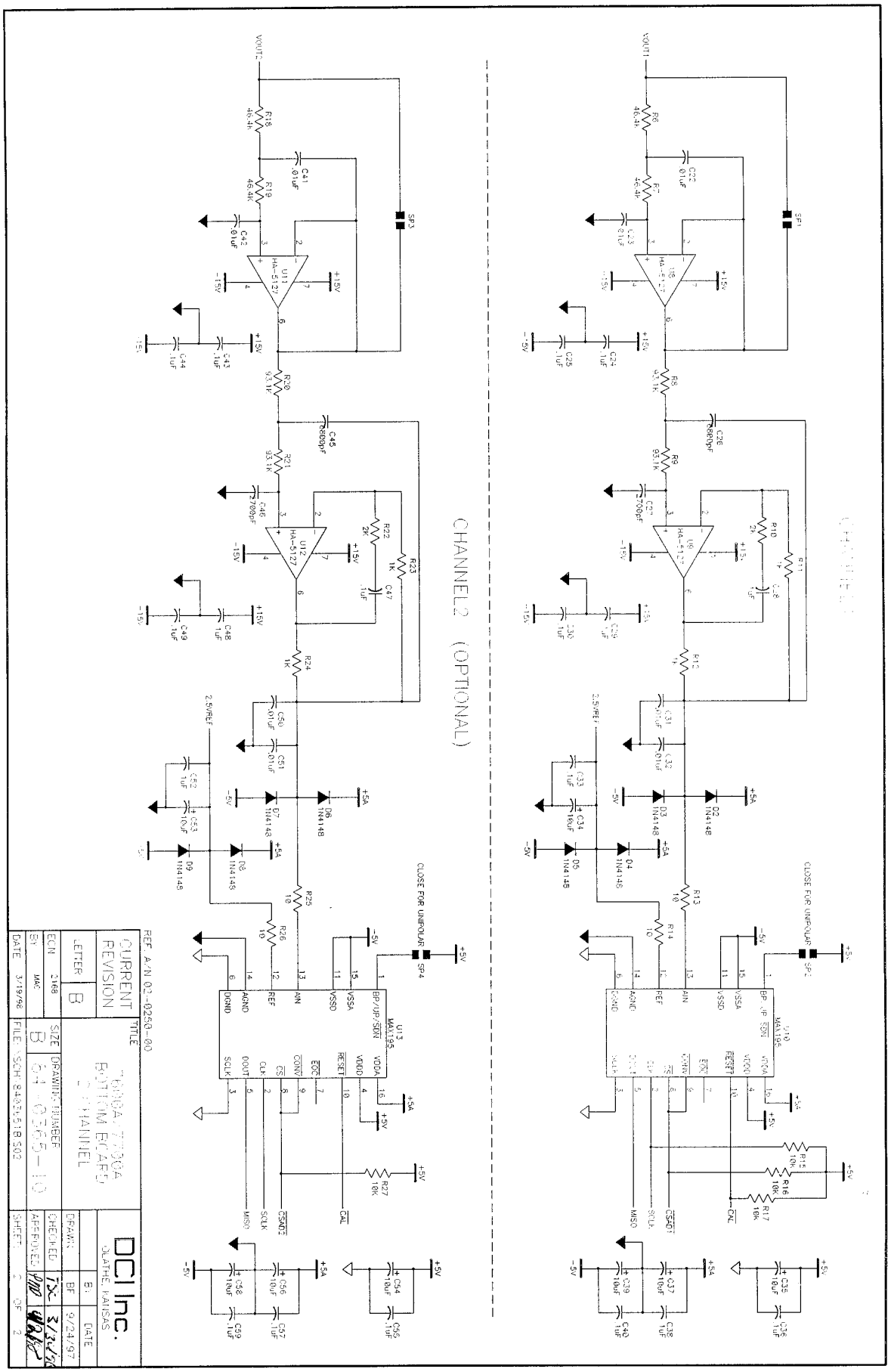

DISPLAY BOARD
DCI Inc.
OLATHE, KANSAS
7600A/7700A
TOP
BOARD
CURRENT
REVISION
LETTER
A
SIZE
B
DRAWING NUMBER
84-0364-00
FILE: TANGO\SCHEM\8403640A.S02
SHEET: 2 OF 3
REF. A/N 02-0249-00
DRAWN
BF
4/29/96
CHECKED
APPROVED
DS1
MAN6640
DS2
MAN6640
DS3
MAN6640
U7:C
74HC126
U7:D
74HC126
U8
74HC165
U9
74HC165
U10
MAX7219CWG
CS165
MISO
PWM
DCOM
VDISP
DISPCOM
MOSI
CSDISP
SCLK
+5V
+5VD

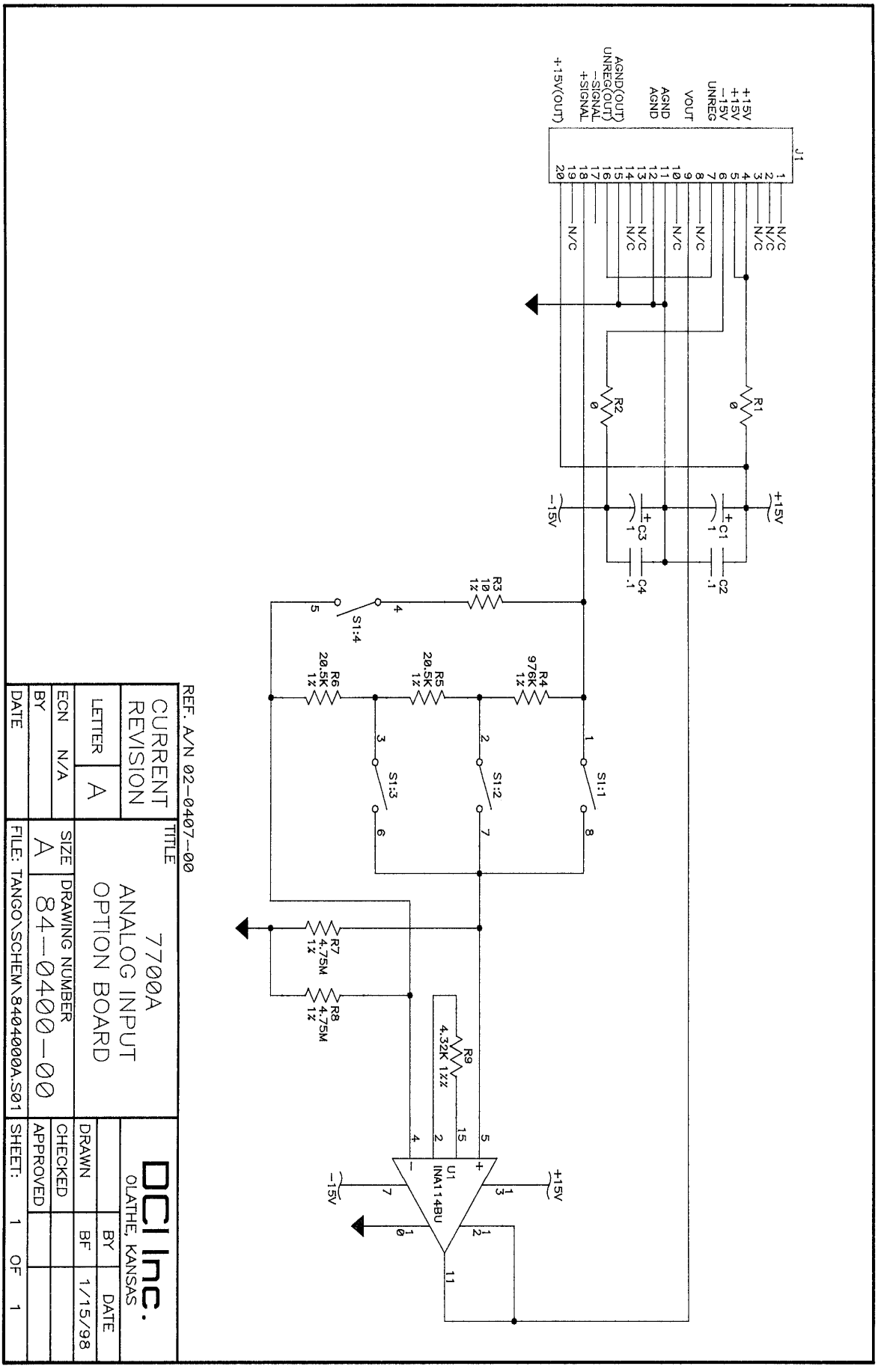


REF: A/N 02-0249-00

CURRENT REVISION		TITLE	DCI Inc. OLATHE, KANSAS
LETTER	A	7600A/7700A TOP BOARD	
ECN N/A	SIZE B	DRAWING NUMBER 84-0364-00	
BY			DRAWN BF 4/29/96
DATE	FILE: TANGO\SCHEM\8403640A.S03		CHECKED [signature] [signature]
			APPROVED [signature] [signature]
			SHEET: 3 OF 3

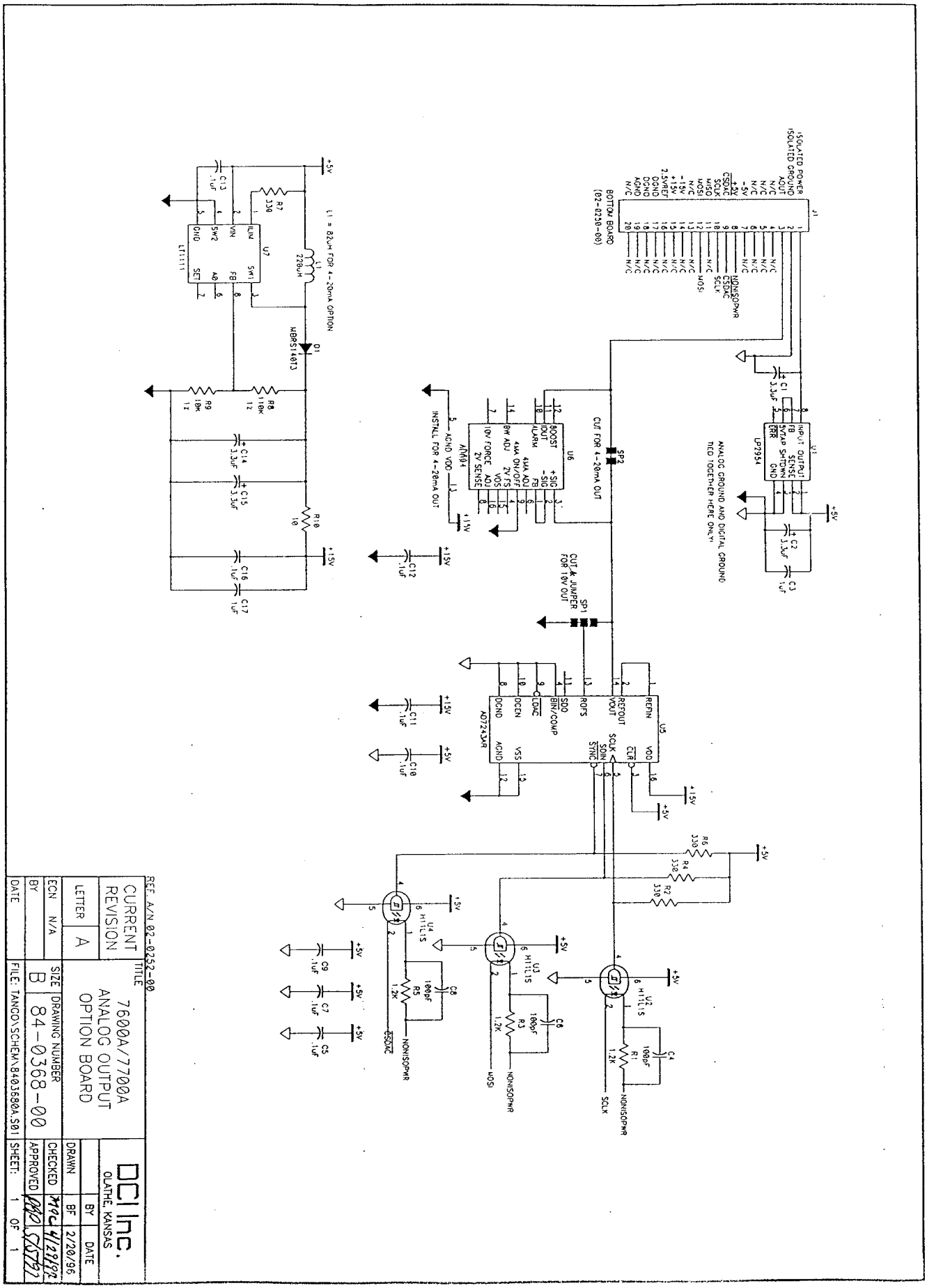

TITLE
7600A/7700A
BOTTOM BOARD
2 CHANNEL
DCI Inc.
OLATHE, KANSAS
CURRENT REVISION
LETTER
E
DRAWING NUMBER
84-0365-10
DRAWN
CHECKED
APPROVED
SHEET 1 OF 2
ANALOG GROUND & DIGITAL GROUND TIED TOGETHER HERE ONLY!
ALTERNATE 10 WATT SWITCHER
CHANNEL1 SIGNAL BOARD
PROCESSOR (TOP) BOARD
ANALOG OUTPUT OPTION BOARD
CHANNEL2 SIGNAL BOARD (OPTIONAL)


CHANNEL2 (OPTIONAL)
CLOSE FOR UNIPOLAR
CURRENT REVISION
LETTER B
DCI Inc.
OLATHE, KANSAS
DRAWN BF 9/24/97
CHECKED
APPROVED
SHEET 2 OF 2
REF. A/N 02-0250-00
DATE 3/19/98



REF. A/N 02-0407-00

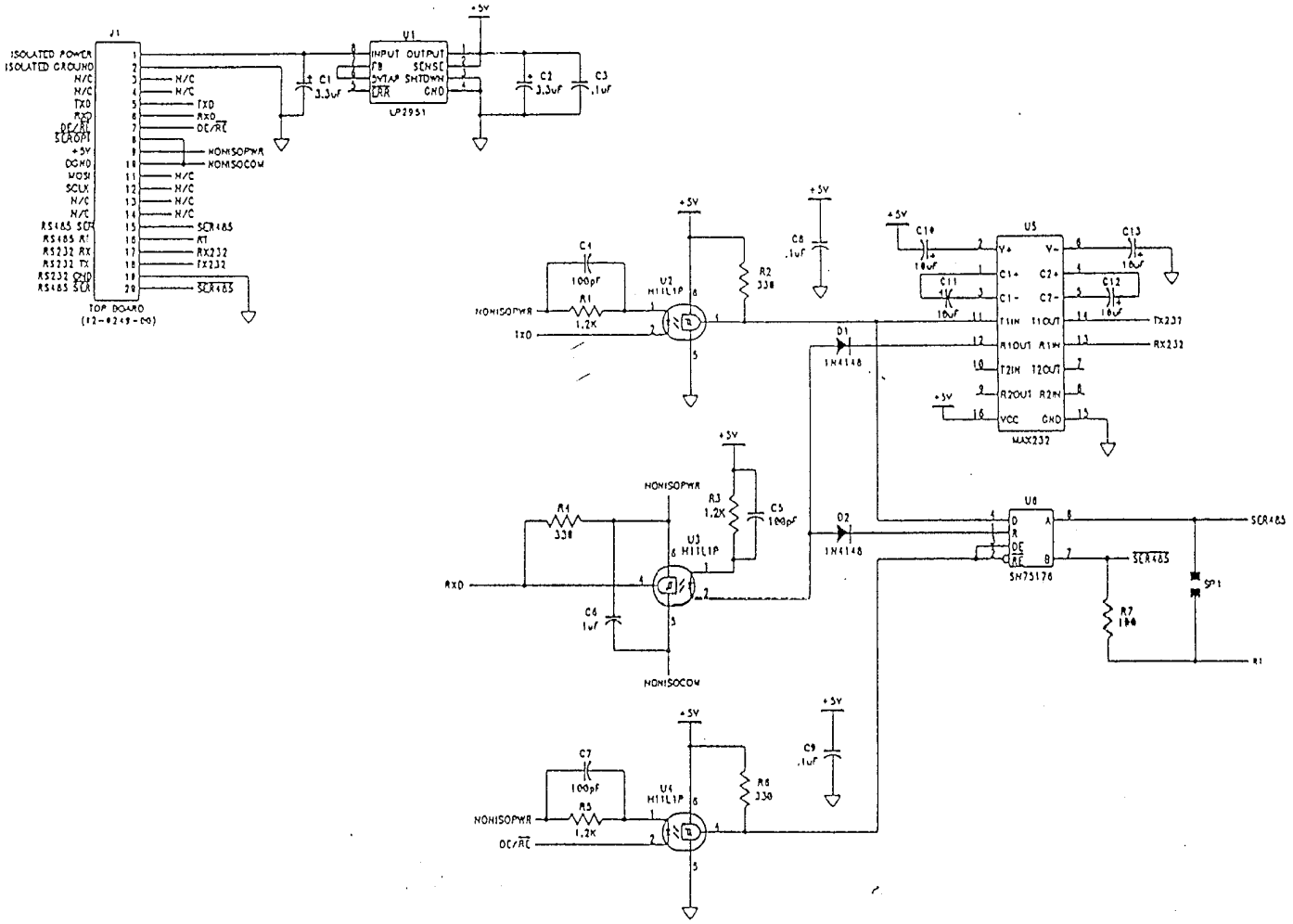
CURRENT REVISION	LETTER A	TITLE 7700A ANALOG INPUT OPTION BOARD	DCI Inc. OLATHE, KANSAS
ECN N/A			DRAWN BY BF DATE 1/15/98
BY	SIZE A	DRAWING NUMBER 84-0400-00	CHECKED
DATE	FILE: TANGO\SCHEM\8404000A.S01		APPROVED
			SHEET: 1 OF 1



REF: A/N 02-0252-00

CURRENT REVISION		TITLE	DCI Inc. OLATHE, KANSAS
LETTER	A	7600A/7700A ANALOG OUTPUT OPTION BOARD	
ECN	N/A		
BY			
DATE			
SIZE	DRAWING NUMBER		
B	84-0368-00		
FILE: TANGO\SCHEM\84036800A.S01			

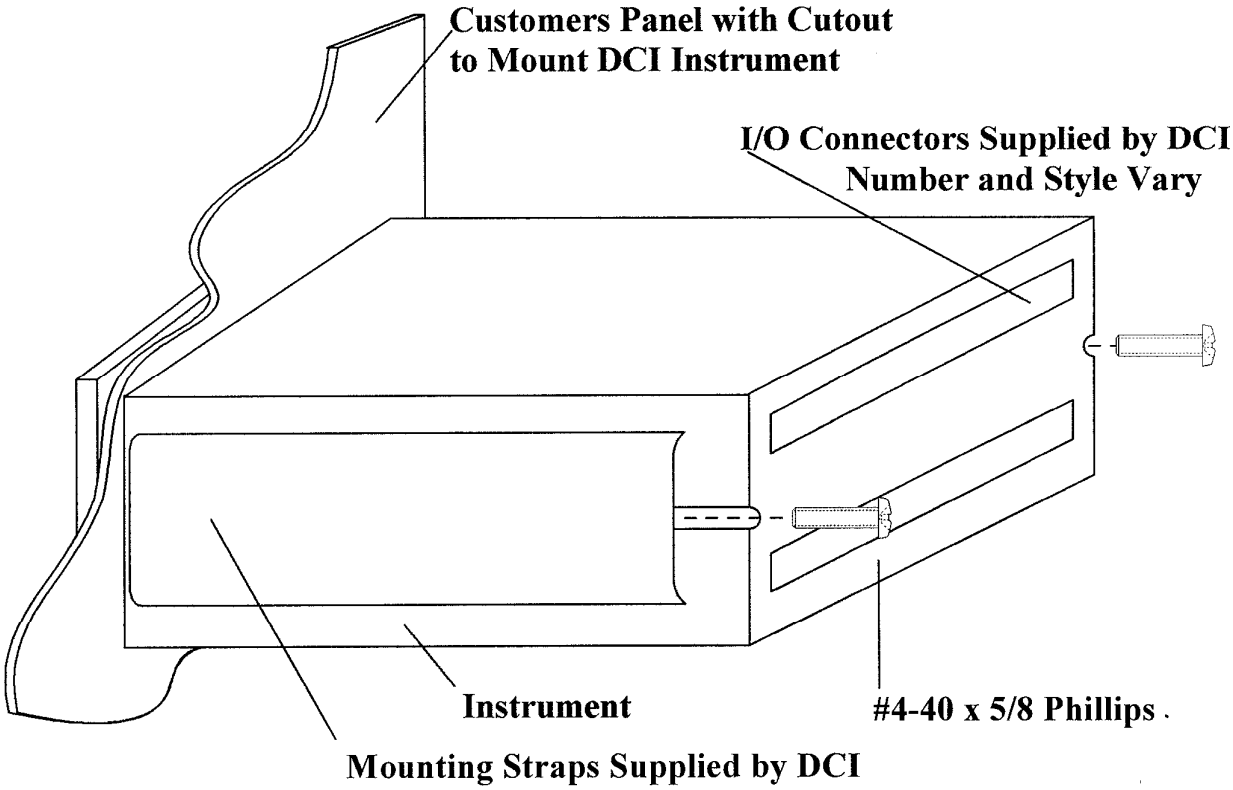
	BY	DATE
DRAWN	BF	2/20/96
CHECKED	[illegible]	4/28/96
APPROVED	[illegible]	5/07/96
SHEET:	1 OF	1



REF. A/N 02-0253-00

CURRENT REVISION	TITLE: 7600A/7700A RS232/RS485 OPTION BOARD	DCI Inc. OLATHE, KANSAS	
LETTER A			BY / DATE
ECN N/A	SIZE B / DRAWING NUMBER 84-0369-00	DRAWN	BF 2/20/97
BY		CHECKED	4-29-97
DATE	FILE: TANCO\SCHEM\8403690A.S01	APPROVED	
		SHEET: 1 OF 1	

MOUNTING



Note: Ground Case per FIGURE 1.0, page 16

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Fax: 913-782-5766
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